

## **CLAIM LISTING**

**1-28.** (Canceled)

**29.** (**Currently Amended**) A machine-implemented method, comprising:  
receiving a multimedia signal having data values;  
forming the data values into a matrix of inputs **X** **[X]**;  
forming a matrix **A** **[A]** of predetermined values and multiplication operations;  
factoring **the matrix A** **[A]** into a butterfly matrix **B** **[B]**, a shuffle matrix **S** **[S]**, and a multiplication matrix **M** **[M]**, wherein the multiplication operations are selectively positioned into pairs within **[M]** **the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1; and**  
executing a Single Instruction Multiple Data (SIMD) instruction that multiplies **the matrices X, B, S, and M** **[X], [B], [S], and [M]** together to obtain a matrix of outputs **[Y]**; **and generating a compressed multimedia signal based on the obtained output matrix Y.**

**30.** (Previously Presented) The machine-implemented method of claim 29, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

**31.** (Canceled)

**32.** (**Currently Amended**) The machine-implemented method of ~~**claim 31**~~ **claim 29**, wherein **the matrix A** **[A]** is a 4-point Discrete Cosine Transform (DCT) transformation matrix, **the matrix X** **[X]** represents a time domain of a video signal, and **the matrix A** **[Y]** represents a frequency domain of the video signal.

33. (Currently Amended) The machine-implemented method of claim 32, wherein the multiplication matrix **M** ~~{M}~~ is

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 & 0 \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 & 0 \\ 0 & 0 & \cos(\frac{3\pi}{8}) & \cos(\frac{\pi}{8}) \\ 0 & 0 & -\cos(\frac{\pi}{8}) & \cos(\frac{3\pi}{8}) \end{bmatrix},$$

and wherein the positioned pairs are  $\frac{1}{\sqrt{2}}$  and  $\frac{1}{\sqrt{2}}$   
 $\frac{1}{\sqrt{2}}$  and  $-\frac{1}{\sqrt{2}}$ .

34. (Currently Amended) A machine-readable medium having instructions to cause a machine to perform a machine-implemented method, comprising:

receiving a multimedia signal having data values;

forming the data values into a matrix of inputs **X** ~~{X}~~;

forming a matrix **A** ~~{A}~~ of predetermined values and multiplication operations;

factoring **the matrix A** ~~{A}~~ into a butterfly matrix **B** ~~{B}~~, a shuffle matrix **S** ~~{S}~~, and a multiplication matrix **M** ~~{M}~~, wherein the multiplication operations are selectively positioned into pairs within ~~{M}~~ **the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1; and**

executing a Single Instruction Multiple Data (SIMD) instruction that multiplies **the matrices X, B, S, and M** ~~{X}, {B}, {S}, and {M}~~ together to obtain a matrix of outputs **{Y}**; **and generating a compressed multimedia signal based on the obtained output matrix Y.**

35. (Previously Presented) The machine-readable medium of claim 34, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

36. (Canceled)

37. (Currently Amended) The machine-readable medium of ~~claim 36~~ claim 34, wherein the matrix A {A} is a 4-point Discrete Cosine Transform (DCT) transformation matrix, the matrix X {X} represents a time domain of a video signal, and the matrix A {Y} represents a frequency domain of the video signal.

38. (Currently Amended) The machine-readable medium of claim 37, wherein the multiplication matrix M {M} is

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 & 0 \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 & 0 \\ 0 & 0 & \cos(\frac{3\pi}{8}) & \cos(\frac{\pi}{8}) \\ 0 & 0 & -\cos(\frac{\pi}{8}) & \cos(\frac{3\pi}{8}) \end{bmatrix},$$

and wherein the positioned pairs are  $\frac{1}{\sqrt{2}}$  and  $\frac{1}{\sqrt{2}}$  .  
 $\frac{1}{\sqrt{2}}$   $-\frac{1}{\sqrt{2}}$

39. (Currently Amended) A system comprising:

a processing unit coupled to a memory through a bus; and

a process executed from the memory by the processing unit to cause the processing unit

to:

receive a multimedia signal having data values;

form the data values into a matrix of inputs X {X};

form a matrix A {A} of predetermined values and multiplication operations;

factor the matrix A {A} into a butterfly matrix B {B}, a shuffle matrix S {S}, and a multiplication matrix M {M}, wherein the multiplication operations are selectively positioned into pairs within {M} the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1; and

execute a Single Instruction Multiple Data (SIMD) instruction that multiplies the matrices X, B, S, and M {X}, {B}, {S}, and {M} together to obtain a matrix of outputs {Y}; and generate a compressed multimedia signal based on the obtained output matrix Y.

40. (Previously Presented) The system of claim 39, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

41. (Canceled)

42. (Currently Amended) The system of ~~claim 41~~ claim 39, wherein the matrix A {A} is a 4-point Discrete Cosine Transform (DCT) transformation matrix, the matrix X {X} represents a time domain of a video signal, and the matrix A {Y} represents a frequency domain of the video signal.

43. (Currently Amended) The system of claim 42, wherein the multiplication matrix M {M} is

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 & 0 \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 & 0 \\ 0 & 0 & \cos(\frac{3\pi}{8}) & \cos(\frac{\pi}{8}) \\ 0 & 0 & -\cos(\frac{\pi}{8}) & \cos(\frac{3\pi}{8}) \end{bmatrix},$$

and wherein the positioned pairs are  $\frac{1}{\sqrt{2}}$  and  $\frac{1}{\sqrt{2}}$  .  
 $\frac{1}{\sqrt{2}}$   $-\frac{1}{\sqrt{2}}$

44. (Currently Amended) The method of claim 29, wherein the butterfly matrix B {B} is of the form

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}.$$

45. (Currently Amended) The machine-readable medium of ~~claim 36~~ claim 34, wherein the butterfly matrix B ~~{B}~~ is of the form

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}$$

46. (Currently Amended) The system of ~~claim 41~~ claim 39, wherein the butterfly matrix B ~~{B}~~ is of the form

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}$$